

## MEETING ABSTRACT

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# Pre-hospital diagnosis for stroke and trauma patients using microwave technology

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From London Trauma Conference 2014  
 London, UK. 9-12 December 2014

## Background

For stroke and traumatic brain injury (TBI) patients minimizing the time from stroke onset/accident to treatment is fundamental to increase the chances of achieving good clinical outcome. For patients with ischemic stroke thrombolytic treatment may be effective, but only 1–8% receive this treatment due to delays in seeking medical attention and late diagnosis. TBI patients with severe injury require immediate transportation to a trauma center. Microwave technology (MWT) has potential to be used for prehospital diagnosis of stroke and TBI patients by detecting intracranial bleedings and thereby make pre-hospital thrombolysis for stroke patients possible and increase triage accuracy for TBI patients.

## Methods

Two clinical trials enrolling 20 + 25 stroke patients performed with research prototype systems (Brain Alfa and Stroke finderR10, Medfield Diagnostics AB, Göteborg, Sweden) have been completed. Two further studies are ongoing.

Regarding TBI laboratory experiments using a human cranium phantom and numerical simulations of subdural hematoma (SDH) have been performed. The first clinical study assessing the potential for MWT to detect SDH has recently started.

The microwave-based systems use 8–12 transmitting and receiving antennas. The classification algorithm is trained on measurements on patients with confirmed diagnosis, using a leave-one-out procedure.

## Results

For the clinical studies on stroke patients all cases of hemorrhagic stroke could be detected while correctly

classifying most cases of ischemic stroke [1]. For the SDH models the total classification accuracy was 98–100%, and SDH of different sizes and at different positions could be distinguished.

## Conclusions

MWT has potential to improve the acute care for stroke and trauma patients by making a prehospital diagnosis. This would lead to decreased human suffering and large societal economic savings.

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Published: 11 September 2015

## Reference

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doi:10.1186/1757-7241-23-S2-A26

**Cite this article as:** Candefjord et al.: Pre-hospital diagnosis for stroke and trauma patients using microwave technology. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 2015 **23**(Suppl 2):A26.

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